WLPCS
Geometry

Name: _____ Date: _____ Per.: _____

4.2 Similar Polygons

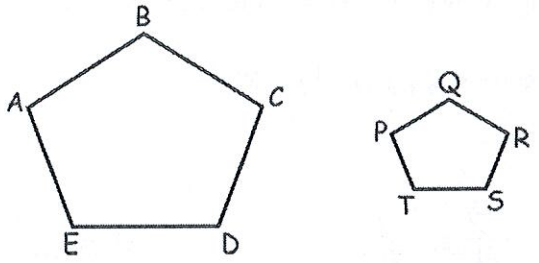
Two polygons are ***similar*** if their vertices can be paired such that:

1) their corresponding angles are congruent.

2) their corresponding sides are proportional.

Another way to think about similar polygons: same shape (not necessarily the same size)

When you name similar polygons, their corresponding vertices must be named in the same order.



For example, if polygon **ABCDE** above is similar to polygon **PQRST**, then we know that:

1) $\angle A \cong \angle P$ $\angle B \cong \angle Q$ $\angle D \cong \angle S$

2) $\frac{AB}{PQ} = \frac{BC}{QR}$ $\frac{CD}{RS} = \frac{DE}{ST}$ $\frac{AE}{PT} = \frac{BC}{QR}$

The ratio of the sides is called the **scale factor**. If, in the polygon above, AB were 12 and PQ were 8, then the **scale factor** 12:8 or 3:2.

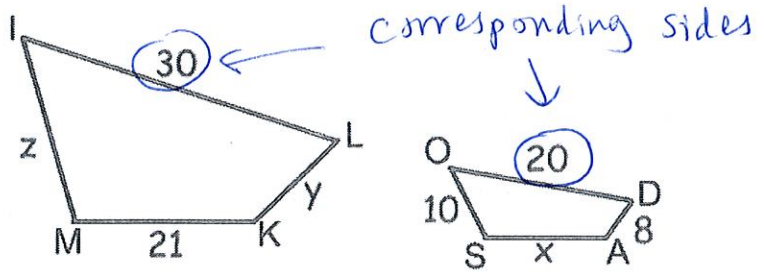
The symbol for similar is ~.

don't forget! ~ means similar

≅ means congruent

WLPCS
Geometry

Example:



Quad. MILK ~ Quad. SODA

Find:

a. their scale factor by putting CORRESPONDING sides in ratio form:

$\frac{30}{20} = \frac{3}{2}$ ← scale factor

b. the values of x, y, and z

$\frac{3}{2} = \frac{21}{x}$ $\quad \frac{3x}{3} = \frac{42}{3}$ $\quad x = 14$

$\frac{3}{2} = \frac{y}{8}$ $\quad \frac{24}{2} = \frac{2y}{2}$ $\quad 12 = y$

$\frac{3}{2} = \frac{z}{10}$ $\quad \frac{30}{2} = \frac{2z}{2}$ $\quad 15 = z$

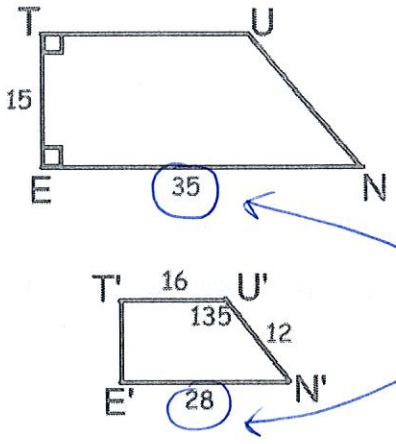
c. the perimeters of the two quadrilaterals

d. the ratio of the perimeters

We didn't do c and d in class! We will do this Monday.

What can you conclude about the ratio of the sides and the ratio of the perimeters?

WLPCS
Geometry



corresponding sides in a ratio (fraction) form is a SCALE FACTOR.

Quad. $TUNE$ ~ Quad. $T'U'N'E'$

1. What is their scale factor?

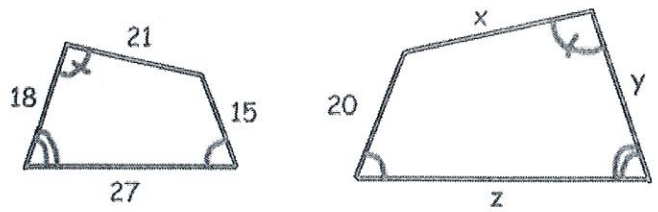
$\frac{35}{28} = \frac{5}{4}$

2. Find: a. the measure of angle U b. TU c. UN d. $T'E'$

we will work on #2 on Monday.

WLPCS
Geometry

Two sets of two similar polygons are shown. Find the values of x, y, and z for each set.:



Scale factor: $\frac{15}{20} = \frac{3}{4}$ - (you can also use $\frac{20}{15}$ or $\frac{4}{3}$)

$\frac{3}{4} = \frac{21}{x}$

$3x = 84$

$x = 28$

$\frac{3}{4} = \frac{18}{y}$

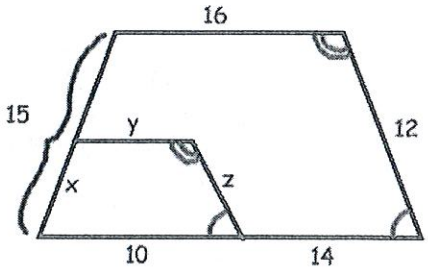
$3y = 72$

$y = 24$

$\frac{3}{4} = \frac{27}{z}$

$3z = 108$

$z = 36$



Scale factor: $\frac{10}{24}$ ← (10+14 for the base of the BIG figure)

$\frac{5}{12}$ (you may also use $\frac{12}{5}$)

$\frac{5}{12} = \frac{x}{15}$

$75 = 12x$

$6.25 = x$

$\frac{5}{12} = \frac{y}{16}$

$12y = 80$

$y = 6.\overline{6}$

$\frac{5}{12} = \frac{z}{12}$

$12z = 60$

$z = 5$